THE MEDICAL SIDE OF THE DRINK QUESTION.

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SIR BENJAMIN WARD RICHARDSON,
M.D., F.R.C.P., F.R.S.

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THE MEDICAL SIDE
OF
THE DRINK QUESTION.

BY

SIR BENJAMIN WARD RICHARDSON,

M.D., F.R.C.P., F.R.S., Etc

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BIOGRAPHICAL NOTE.

By Dawson Burns, D.D.

As the readers of this pamphlet may naturally wish to know something of the distinguished physician whose carefully-recorded thoughts on the subject of Temperance are here reproduced, it may be said that Sir Benjamin Ward Richardson was born on the 31st of October, 1828, at Somerby, in the county of Leicestershire, and that after being well grounded in a classical and general education, he chose the medical profession as his life's work, and soon afterwards entered Anderson's University in Glasgow. He then acted as medical assistant for some time successively at Saffron Walden and Narborough, and graduated in 1854 at the University of St. Andrews, whence he subsequently received his honorary degrees of M.A. and LL.D. Making London his residence, he became a copious contributor to the *Medical Gazette*, and was awarded a prize of two hundred guineas for an essay on "Heredity in Relation to Disease"; won the Fothergillian gold medal, and gained the Astley Cooper prize of three hundred guineas for an essay on the coagulation of the blood. Having become a Member (afterwards Fellow) of the Royal College of Physicians, Sir Benjamin devoted himself to original experimental researches in medical and sanitary science, and with so much appreciated success, that he was elected a Fellow of the Royal Society in 1867, and, in 1868, was presented by six hundred of his medical brethren with a splendid microscope and a purse of a thousand guineas as a mark of their admiration and regard.

Besides having founded, and edited for a considerable time, the *Journal of Public Health* (1855), and the *Social Science Review*, Sir Benjamin has written several valuable books bearing on social health and sanitation; and as President of the Health Department of the Social Science Congress in 1875, he depicted in glowing colours the Ideal City of Health. Every number of the *Æisclepiad*, a quarterly medical journal, begun some years ago, has been entirely written by him. He has been repeatedly chosen President of the London Medical Society and other learned bodies, and it was but fitting that the Royal favour should crown other tributes to Richardson, by conferring upon him the honour of knighthood in 1893.

Sir Benjamin Richardson's connection with the Temperance movement may be said to date from the delivery of the Cantor Lectures on Alcohol in November and December, 1874, and January and February, 1875, though he was not a constant and avowed abstainer till a short time later. His public adhesion to total abstinence, on purely scientific principles, was followed by the delivery of many speeches and lectures, and the issue of various important publications, one of which, "The Temperance Lesson Book," is extensively used in the Schools of this and other countries.

Sir Benjamin has been President of the British Medical Temperance Association from its commencement, and in 1892 he was elected Physician to the London Temperance Hospital, founded in 1873.

The "Cantor Lectures on Alcohol," Five "Addresses on Total Abstinence," the "Lesson Book," and "Dialogues on Drink," have furnished nearly the whole of the contents of this pamphlet, to the appearance of which Sir Benjamin gave his consent and approval.

Since the foregoing was in type, the eminent Teacher, some of whose words of wisdom on the Temperance topic are here recorded, has ceased to be numbered among those who have visible converse with their fellow-men. He had been ailing for some considerable time, but visited the Temperance Hospital on November 17th, and on the following day attended a private meeting in the City ; but shortly after dining a stroke of apoplexy rendered him insensible, and in that state he remained till the morning of the 21st, when he tranquilly passed away.

It is his greatest distinction and honour that he united rare intellectual gifts with a gentle and benevolent heart, and devoted many laborious years to the noble task of rendering the world healthier and wiser. He had co-adjutors in various fields of mental and social enterprise, but, perhaps to him more than to any other of his contemporaries may be awarded the title he would most have loved—that of the SCIENTIFIC PHILANTHROPIST OF THE NINETEENTH CENTURY.

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CHAPTER I.

HOW SIR BENJAMIN RICHARDSON BECAME AN ABSTAINER.

IN the years 1860-1, when engaged in some experimental physiological researches, I began for the first time to doubt the commonly-accepted value and physiological position of alcohol. Before that time I had passed in review the works of more than one learned and earnest medical scholar on the subject. The late excellent surgeon and admirable man, Mr. Higginbottom, of Nottingham, had appealed to me through his works. The distinguished professor of surgery in Edinburgh, the late Professor Miller; one no less distinguished in the sister island, Dr. Cheyne, of Dublin; and one other, no less eminent in this city, Dr. W. B. Carpenter, had in like manner appealed to me and to the whole reading world on this subject. I knew the works of these writers well, and also the works of many illustrious men who had flourished before this generation altogether; but I was not influenced by any of their appeals beyond entertaining for them a feeling of sincere respect. I am happy now to remember them, knowing how solemnly right they were, and how foolishly I was wrong. I did, at all events, give them respect, and did not, in my ignorance, rave at them as fanatics, nor count them as having forsaken their calling because they were bold enough to declare the truth as it was revealed to them through the investigation of nature.

In short, their arguments were not such as conveyed conviction at that time to my mind, and it was not until certain physiological facts, which contradicted in the flattest manner my preconceived beliefs, were unanswerably before me, that I began to doubt on the one hand and inquire anew on the other. In course of time I came to certain conclusions which were embodied in a paper on the physiological action of the alcohols, and which ran counter to much that was accepted. But this conversion, so far, towards the truth of total abstinence as the best policy for all men, did not influence me in relation to habit and mode of life. At last, about 1869, I began to abstain, at intervals, for experimental purposes, and finding myself in many ways benefited during the period of abstinence, I determined to abstain more systematically, and, if possible, altogether. The one great obstacle to success which so many men feel, and which to weak-minded men is often a permanent obstacle, was now the social difficulty. What should be done in society, what at my own table, what at the table of friends? I strove to meet the difficulty by acting on a hint from Sir Walter Raleigh that wine should be only used for purposes of recreation, and that this anciently was its use. So I abstained on all occasions except at the feast, if I may express myself in a simple way. The practice led to another new and unanswerable experience, viz., that however temperate I might be I was less healthy after the feast, and far less disposed to return to the condition of health that was invariably connected with the period of total abstinence. In the face of this observation, repeated over and over again, I determined at last to abstain absolutely.

These are the plain and light-of-day facts as to the reason of my adhesion to the cause of total abstinence from alcohol, and having derived great benefit both in knowledge and health by that change, I have felt it a duty to teach the truth by precept as well as example, and to show on what just and reasonable grounds the truth is based.

CHAPTER II.

THE FAMILY OF ALCOHOLS.

THE Alcohols, as a family of chemical bodies, have all a common principle of action when they are introduced into the living animal body. The symptoms they induce differ in degree, but the difference is not specific in character ; it is only in degree. The difference depends on nothing more than the weight and degree of solubility of the alcohol employed. From the lightest of the alcohols, the methylic,—which is so light that without much difficulty it can be made to act as an anæsthetic, and can be administered in the form of vapour—through ethylic or common alcohol, up to the heavier alcohols, propylic, butylic, amylic, the stages of action are maintained. The phenomena are maintained in each stage, and with one exceptional additional phenomenon, in the case of the heavier alcohols, show no difference, save and except in the matter of time in which the stages are developed, and in the periods of their continuance. All through the series, indeed, when we are looking at the phenomena induced by them on living organisms, we are observing the action of the oxide of an organic radical, constructed throughout on the same type, containing the same elements in the same relative proportions, and producing no modification of action beyond what is dependent on chemical condensation, and the physical distinctions which naturally result therefrom.

Methylic alcohol, obtained by the distillation of wood, was discovered by Mr. Philip Taylor in 1812, It burns at a lower temperature than ethylic alcohol, viz., at 140° Fahr. It has an aromatic smell, and is slightly acid. Mixed with ordinary spirit, it is much employed for spirit-lamps, and for various purposes in the Arts. It is sold under the name of methylated spirits. The radical methyl is made up of one part of carbon and three parts of hydrogen, and methylic alcohol, which is composed of one part of carbon, four parts of hydrogen, and one of oxygen, has the chemical formula of CH_4O.

When molasses, grain, or other fermentable substances are subjected to the process of fermentation, there may be produced several bodies of the alcohol series, each one of them distinguished from the rest by its weight, boiling point, and other physical qualities. Generally speaking, the first product is called crude spirit, and when this is put into a retort and is subjected to the process of re-distillation, different fluids, different alcohols, distil over according to the degree of heat that is employed in the distillation, and so the crude liquor is divided into different parts, which may be separately collected by repeated distillations. In distilling French brandy the main product obtained is the liquid named brandy, *eau de vie*, which liquid contains over fifty per cent. of ethylic alcohol. But when the distillation is continued there is obtained another alcohol as well as the ethylic, which is heavier, of more pungent odour, and of a more oily and disagreeable taste. This alcohol is called chemically "propylic alcohol." It is composed of a radical of carbon and hydrogen named propyl, combined as before with oxygen. There are in this radical three parts of carbon and seven of hydrogen. The chemical formula is C_3H_8O. This alcohol boils at 195° Fahr., and has a specific weight of 758 compared with water as 1,000.

When the crude spirit derived from the fermentation of beet-root treacle is distilled, there passes over in vapour at the latter period of the distillation a heavy alcohol called butylic alcohol, composed of a radical of four parts of carbon and nine of hydrogen, known as butyl. The composition of bulytic alcohol is formulated as $C_4H_{10}O$. It produces a peculiar intoxication attended with severe tremblings of the muscles. It makes the body exceedingly cold, and recovery from its bad effects is very slow.

By the fermentation of potatoes, as well as of beet, molasses, and of grapes, there is produced a fluid substance which remains when the lighter alcohols have been distilled over, and to which the name of crude potato spirit or fusel oil has been applied. This fluid is of oily appearance, and is of a most nauseous odour. The smell of it adheres for a long time to everything that is touched by it. The crude fluid is made up of several parts, but it consists chiefly of a distinct alcohol which can be separated by careful distillation, and is called "amylic alcohol," which is composed of a radical of five parts of carbon and eleven of hydrogen, and this radical amyl is combined in the alcohol with one part of hydrogen and one of oxygen. The chemical formula of this alcohol is $C_5H_{12}O$. It has a specific weight of 811 and boils at 270° Fahr. It produces intoxication of a most dangerous kind. The muscles of the body are made tremulous, and the whole body is made deathly cold. In bad specimens of common spirit such as whisky this alcohol is present and renders them very hurtful and dangerous.

CHAPTER III.

THE COMPOSITION OF ETHYLIC ALCOHOL. THE ALCOHOL OF FERMENTED AND DISTILLED LIQUORS.

WE know that alcohol burns in the air, because it contains in itself two elements, or bodies, neither of which can be divided into anything further. These elements are carbon and hydrogen. The carbon in its separate state is a solid, dark substance, like the soot which can be collected from the smoke of a burning candle, which is impure carbon. Hydrogen in its separate state is a gas, the lightest of all the known substances in nature. In alcohol these two elements are united together in the proportion of two ultimate or atomic parts of the carbon to five of the hydrogen. In this state of combination, these elements constitute what is called a radical, by which is meant a substance that acts as if it were itself an element, though composed of two or more elements. The radical so formed has received the special name of ethyl. In alcohol the radical ethyl is combined with the elements which constitute water in the proportion of one ultimate or atomic part of oxygen to two parts of hydrogen. In alcohol one of the atomic parts of the hydrogen of water is replaced by one part of the radical ethyl. Alcohol consists of nine atomic parts—two of carbon, six of hydrogen, and one of oxygen. The chemical formula is $C_2H_6O_1$.

Pure alcohol is a transparent fluid; it is of rather pungent odour; it is hot or burning to the tongue, and it burns in the air. It is much lighter in weight than water. A bottle filled with water, weighing 1,000 grains, will be equally filled with alcohol weighing only 792 grains, or 208 grains less than the weight of water. Alcohol brought to this weight of 792° is termed absolute alcohol, as having no water left in it. What is commonly sold as pure alcohol is not refined to such a degree, so it weighs heavier, and may have a specific gravity of 830°.

Alcohol boils at a lower temperature than water, the boiling point of which is 212° Fahrenheit, while that of alcohol is 172°. If a thermometer on the Centigrade scale were used, water would be found to boil at 100° and alcohol at 78°.

CHAPTER IV.

HOW ALCOHOL ACTS ON THE BODY.*

WHEN we know the course which alcohol takes in its passage through the body, from the period of its absorption to that of its elimination, we are the better able to judge what physical changes it induces in the different organs and structures with which it comes in contact. It first reaches the blood, but, as a rule, the quantity of it that enters is insufficient to produce any material effect on that fluid. If, however the dose taken be poisonous or semi-poisonous, then even the blood, rich as it is in water—and it contains seven hundred and ninety parts in a thousand—is affected. The alcohol is diffused through this water, and there it comes in contact with the other constituent parts, with the fibrine, that plastic substance which, when blood is drawn, clots and coagulates, and which is present in the proportion of from two to three parts in a thousand; with the albumen which exists in the proportion of seventy parts; with the salts which yield about ten parts; with the fatty matters; and lastly, with those minute, round bodies which float in myriads in the blood (which were discovered by the Dutch philosopher, Leuwenhock, as one of the first results of microscopical observation, about the middle of the seventeenth century), and which are called the blood globules or corpuscles. These last-named bodies are, in fact, cells; their discs, when natural, have a smooth outline, they are depressed in the centre, and they are red in colour, the colour of the blood being derived from them. We have discovered in recent years that there exist other corpuscles or cells in the blood in much smaller quantity, which are called white cells, and these different cells float in the blood-stream within the vessels. The red take the centre of the stream; the white lie externally near the sides of the vessels, moving less quickly.

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* From the Cantor Lectures on Alcohol, 1875 (Macmillan and Co.).

I must pass next to blood vessels, and trace out the action upon those fine ramifications of the larger vessels which we call the minute circulation. Upon these parts the spirit exerts a singular influence, from which arise a series of phenomena, characteristic of action when even a moderate quantity of spirit is taken into the body.

By this influence it produces all those peculiar effects which in every-day life are so frequently illustrated. It paralyzes the minute blood-vessels, and allows them to become dilated with the flowing blood.

THE FIRST STAGE.

If you attend a large dinner party, you will observe after the first few courses, when the wine is beginning to circulate, a progressive change in some of those about you who have taken wine. The face begins to get flushed, the eye brightens, and the murmur of conversation becomes loud. What is the reason of that flushing of the countenance? It is the same as the flush from blushing, or from the reaction of cold, or from the nitrate of amyl. It is the dilatation of vessels following upon the reduction of nervous control, which reduction has been induced by the alcohol. In a word, the first stage, the stage of vascular excitement from alcohol, has been established.

The action of the alcohol extending so far does not stop there. With the disturbance of power in the extreme vessels, more disturbance is set up in other organs, and the first organ that shares in it is the heart. With each beat of the heart a certain degree of resistance is offered by the vessels when their nervous supply is perfect, and the stroke of the heart is moderated in respect both to tension and to time. But when the vessels are rendered relaxed, the resistance is removed, the heart begins to run quicker, like a watch from which the pallets have been removed, and the heart-stroke, losing nothing in force, is greatly increased in frequency, with a weakened recoil stroke. It is easy to account in this manner for the quickened heart and pulse which accompany the first stage of deranged action from alcohol. The information on this point is exceedingly curious and important. After I had observed the effect of alcohol on the circulation generally, I attempted to calculate the rate at which it expedited the rate of circulation by observing its effect on the beat of the heart in the pigeon. Alcohol may be administered to this bird quite painlessly, and, as the animal quickly goes to sleep under the influence, and is therefore perfectly quiet, the beatings of its heart can be calculated with precision. I traced in these observations an increase of beats of the heart amounting, in the course of two hours, to one-fourth beyond what was natural. Information has also been ably supplied by the researches of Dr. Parkes, of Netley, and the late Count Wollowicz. The observers conducted their inquiries on the young and healthy adult man. They counted the beats of the heart, first at regular intervals, during what were called water periods, that is to say, periods when the subject under observation drank nothing but water; and next, taking still the same subject, they counted the beats of the heart during successive periods in which alcohol was taken in increasing quantities. Thus step by step they measured the precise action of alcohol on the heart, and thereby the precise primary influence induced by alcohol. Their results are stated by themselves as follows :—

"The average number of beats of the heart in 24 hours (as calculated from eight observations made in 14 hours), during the first, or water period, was 106,000; in the earlier alcoholic period it was 127,000, or about 21,000 more; and in the later period it was 131,000, or 25,000 more.

"The highest of the daily means of the pulse observed during the first or water period was 77·5; but on this day two observations are deficient. The next highest daily mean was 77 beats.

"If, instead of the mean of the eight days, or 73·57, we compare the mean of this one day, viz., 77 beats per minute, with the alcoholic days, so as to be sure not to over-estimate the action of the alcohol, we find :—

"On the 9th day, with one fluid ounce of alcohol, the heart beat 4,300 times more.

"On the 10th day, with two fluid ounces, 8,172 times more.

"On the 11th day, with four fluid ounces, 12,960 times more.

"On the 12th day, with six fluid ounces, 20,672 times more.

"On the 13th day, with eight fluid ounces, 23,904 times more.

"On the 14th day, with eight fluid ounces, 25,488 times more.

"But as there was ephemeral fever on the 12th day, it is right to make a deduction, and to estimate the number of beats in that day as midway between the 11th and 13th days, or 18,432. Adopting this, the mean daily excess of beats during the alcoholic days was 14,492, or an increase of rather more than 13 per cent.

"The first day of alcohol gave an excess of 4 per cent., and the last of 23 per cent.; and the mean of these two gives almost the same percentage of excess as the mean of the six days.

"Admitting that each beat of the heart was as strong during the alcoholic period as in the water period (and it was really more powerful), the heart on the last two days of alcohol was doing one-fifth more work.

"Adopting the lowest estimate which has been given of the daily work of the heart, viz., as equal to 12.2 tons lifted one foot, the heart during the alcoholic period, did daily work in excess equal to lifting 15·8 tons one foot, and in the last two days did extra work to the amount of 24 tons lifted as far.

"The period of rest for the heart was shortened, though, perhaps, not to such an extent as would be inferred from the number of beats, for each contraction was sooner over. The heart, on the fifth and sixth days after alcohol was left off, and apparently at the time when the last traces of alcohol were eliminated, showed in the sphygmographic tracings signs of unusual feebleness; and, perhaps, in consequence of this, when the brandy quickened the heart again, the tracings showed a more rapid contraction of the ventricles, but less power than in the alcoholic period. The brandy acted, in fact, on a heart whose nutrition had not been perfectly restored."

It will seem at first sight almost incredible that such an excess of work could be put upon the heart, but it is perfectly credible when all the facts are known. The heart of an adult man makes, as we see above, 73·57 strokes per minute. This number multiplied by sixty for the hour, and again by twenty-four hours for the entire day, would give nearly 106,000 as the number of strokes per day. There is, however, a reduction of stroke produced by assuming the recumbent position and by sleep, so that for simplicity's sake we may take off the 6,000 strokes, and speaking generally may put the average at 100,000 in the entire day. With each of these strokes the two ventricles of the heart, as they contract, lift up into their respective vessels three ounces of blood each, that is to say, six ounces with the combined stroke, or 600,000 in the twenty-four hours. The equivalent of work rendered by this simpler calculation would be 116 foot tons; and if we estimate the increase of work induced by alcohol we shall find that four ounces of spirit increase it one-eighth part; six ounces, one-sixth part; and eight ounces, one-fourth part.

The stage of primary excitement of the circulation thus induced lasts for a considerable time, but at length the heart flags from its over action, and requires the stimulus of more spirit to carry it on in its work. Let us take what we may call a moderate amount of alcohol, say two ounces by volume, in form of wine, or beer, or spirits. What is called strong sherry or port may contain as much as twenty-five per cent. by volume. Brandy over fifty, gin, thirty-eight; rum, forty-eight; whisky, forty-three; vin ordinaire, eight; strong ale, fourteen; champagne, ten to eleven; it matters not which, if the quantity of alcohol be regulated by the amount present in the liquor imbibed. When we reach the two ounces, a distinct physiological effect follows, leading on to that first stage of excitement with which we are now conversant. The reception of the spirit arrested at this point, there need be no important mischief done to the organism; but, if the quantity imbibed be increased, further changes quickly occur. We have seen that all the organs of the body are built upon the vascular structures, and therefore it follows that a prolonged paralysis of the minute circulation must of necessity lead to disturbance in other organs than the heart.

By common observation the flush seen on the cheek during the first stage of alcoholic excitation is presumed to extend merely to the parts actually exposed to view. It cannot, however, be too forcibly impressed that the condition is universal in the body. If the lungs could be seen, they too would be found with their vessels injected; if the brain and spinal cord could be laid open to view, they would be discovered in the same condition; if the stomach, the liver, the spleen, the kidneys, or any other vascular organs or parts could be exposed, the vascular engorgement would be equally manifest. In the lower animals I have been able to witness this extreme vascular condition in the lungs, and there are here presented to you [in the original Lecture] two drawings from nature, showing, one the lungs in a natural state of an animal killed by a sudden blow, the other the lungs of an animal killed equally suddenly, but at a time when it was under the influence of alcohol. You will see, as if you were looking at the structures themselves, how different they are in respect to the blood which they contained, how intensely charged with blood is the lung in which the vessels had been paralyzed by the alcoholic spirit.

THE SECOND STAGE.

The action of alcohol continued beyond the first stage, the function of the spinal cord is influenced. Through this part of the nervous system we are accustomed, in health, to perform automatic acts of a mechanical kind, which proceed systematically even when we are thinking or speaking on other subjects. Thus a skilled workman will continue his mechanical work perfectly, while his mind is bent on some other subject; and thus we all perform various acts in a purely automatic way, without calling in the aid of the higher centres, except something more than ordinary occurs to demand their service, upon which we think before we perform. Under alcohol, as the spinal centres become influenced, these pure automatic acts cease to be correctly carried on. That the hand may reach any object, or the foot be correctly planted, the higher intellectual centre must be invoked to make the proceeding secure. There follows quickly upon this a deficient power of co-ordination of muscular movement. The nervous control of certain of the muscles is lost, and the nervous stimulus is more or less enfeebled. The muscles of the lower lip in the human subject usually fail first of all, then the muscles of the lower limbs, and it is worthy of remark that the extensor muscles give way earlier than the flexors. The muscles themselves by this time are also failing in power; they respond more feebly than is natural to the nervous stimulus; they, too, are coming under the depressing influence of the paralyzing agent, their structure is temporarily deranged, and their contractile power reduced. This modification of the animal functions under alcohol marks the second degree of its action. In young subjects there is now, usually, vomiting with faintness, followed by gradual relief from the burden of the poison.

THE THIRD STAGE.

The alcoholic spirit carried yet a further degree, the cerebral or brain centres become influenced; they are reduced in power, and the controlling influences of will and of judgment are lost. As these centres are unbalanced and thrown into chaos, the rational part of the nature of the man gives way before the emotional, passional, or organic part. The reason is now off duty, or is fooling with duty, and all the mere animal instincts and sentiments are laid atrociously bare. The coward shows up more craven, the braggart more boastful, the cruel more merciless, the untruthful more false, the carnal more degraded. "*In vino veritas*" expresses even indeed to physiological accuracy, the true condition. The reason, the emotions, the instincts, are all in a state of carnival, and in chaotic feebleness.

THE FOURTH STAGE.

Finally, the action of alcohol still extending, the superior brain centres are overpowered; the senses are beclouded, the voluntary muscular prostration is perfected, sensibility is lost, and the body lies a mere log, dead by all but one-fourth, on which alone its life hangs. The heart still remains true to its duty, and while it just lives it feeds the breathing power. And so the circulation and the respiration, in the otherwise inert mass, keeps the mass within the bare domain of life until the poison begins to pass away and the nervous centres to revive again. It is happy for the inebriate that, as a rule, the brain fails so long before the heart that he has neither the power nor the sense to continue his process of destruction up to the act of death of his circulation. Therefore he lives to die another day.

Thus there are four stages of alcoholic action in the primary form :—(*a*) A stage of vascular excitement and exhaustion ; (*b*) a stage of excitement and exhaustion of the spinal cord, with muscular perturbation ; (*c*) a stage of unbalanced reasoning power and of volition ; (*d*) a stage of complete collapse of nervous function.

CHAPTER V.

IS ALCOHOL A FOOD?

Does it Build Up the Body?

THE living animal body is constructed out of a few simple forms of matter which possess, during life, the power of motion. It is, in its living state, a noun and a verb. Whatever helps to maintain it in perfect order of construction, whatever enables it to move of its own mere will and motion, may be considered as a food. The one gives matter, and mass, the other gives force or spirit to the mass. With the progress of organic chemistry, after the discovery of the art of organic analysis, it soon became evident that what are called foods are divisible into two great classes; those which supply material or tissue, and those which supply heat or other variety of force. Gradually it was detected that the building foods all contain the element nitrogen as an essential part, and that the force-supplying foods are free of nitrogen and are hydro-carbons, substances that will undergo combustion by oxidation, and liberate force for the motive uses of the economy. So foods have for a long time been sharply classified as nitrogenous or tissue-feeding, and as respiratory or heat-producing.

The nitrogenous foods exist in the animal body in the form of what is called colloidal matter, the word *colloidal* being a term signifying a jelly-like substance. The purest form of this matter is found in the blood in the white, elastic, plastic matter, called fibrine. By repeated washings of a portion of this substance, I have prepared here, from the blood of the ox, a beautiful specimen of this colloid of the blood. Of a similar colloidal substance the moving muscles are formed. In a fluid state, and permanently fluid at the temperature of the living body, the colloid called albumen forms part of organic structure. Under the names of gelatine and chrondine, a nitrogenous colloidal substance forms the organic matter of the skeleton, of the cartilages, of the sheaths of muscles, of the tendons. The eye-ball is constructed out of a series of colloidal tissues. All the membranes which envelop the visceral organs, and which possess elasticity, are colloidal. The outer covering or skin is colloidal, the nails are the same. Even in the brain and nervous matter there is distributed a colloid. Thus, if we sum up the various parts of the body we may say that all the active masses of structure are nitrogenous and colloidal.

In combination with this active matter there are, however, two other material ingredients, viz., water and saline substance. Upon its combination with water the activity of the coloid depends. Upon the saline rests the various kinds of combination of the colloid with the water. In bone the gelatine is combined with a salt, called phosphate of lime, with carbonate of lime, and other salts, in much larger proportion than itself. In fibrine the colloidal substance is nearly divested of saline; but in all parts these three material compounds make up the animal structures.

Lying outside these structures in the natural state, but really as an adventitious formation, is one other animal product, viz., fat; a substance detrimental to the motion of the active parts when present in excess, but at the same time capable of combustion, and of yielding heat by the process.

We have now before us the constructive or building parts of the animal body. Excepting the water, the salts, and the fat, they all contain nitrogen, and they take their specific quality from that specific fact. We know that the source of them is the vegetable kingdom, that they are formed by nature in that kingdom, are transferred from the vegetable to the animal, are not made by any natural process within the animal, have not yet been made by any artificial process known to the chemist, and can therefore only be supplied from the one natural supply.

Alcohol contains no nitrogen, it has none of the qualities of these structure-building foods; it is incapable of being transformed into any of them; it is therefore not a food in the sense of its being a constructive agent in the building up of the body.

In respect to this view there is, I believe, now no difference of opinion amongst those who have most carefully observed the action of alchol. There is, however, a difference in relation to its action as a fat-forming food. It appears to be on evidence that men and animals beginning, while in a perfect state of health, to take in excess certain fluids containing alcohol become fattened. Notoriously, ale and beer fatten; and in some parts of the country certain animals—calves for instance—are rapidly fattened by the process of feeding them with a mixture of barley flour and gin. But through all these apparent evidences there may run an error. The fattening may not be due to the alcohol itself, but to the sugar or starchy material that is taken with it. As a matter of general experience on which I have tried to arrive at the truth with as much accuracy as can be obtained, I am led to the conclusion that pure spirit drinkers among men—I mean those who do not mix sugar with the spirit, and who dislike spirit which is artificially sweetened—are not fattened by the spirit they take. This tallies also with the observations on the action of absolute alcohol on inferior animals, for they certainly, under that influence, if they are allowed liberty to move freely, do not fatten.

Does Alcohol Yield Warmth and Force?

But if alcohol be not a substance out of which the animal tissues are formed, may it not be a source of energy of actual motion; may it not supply the power of doing work?

Under favouring conditions, alcohol will oxidize in the presence of the air. In two ways—actively, with the production of much heat and with the formation of carbonic acid and water; passively, with the production of aldehyde and acetic acid.

In the human body do any similar changes take place? Throughout the whole of the vast sheet of the minute circulation, there is ever in progress, during life, a process of slow oxidation of carbon and hydrogen, by which heat is produced, and carbonic acid and water are produced. The heat is proved by the animal warmth which is ever present in our bodies while we live; the carbonic acid and water, as products, are proved by their continued presence in the secretions from the lungs, skin, and other organs.

Alcohol we have seen is carried by the blood into this minute circulation. Is it possible it can pass through that ordeal and undergo no chemical change. If it does undergo any change, what is its nature?

The earlier physiologists of this century came, naturally enough, to the conclusion that the alcohol taken into the body is consumed there with the evolution of heat. A certain development of heat in the superficies of the body, and a certain sensation of glow which follows upon the imbibition of spirit lent countenance to this suspicion. But in course of time, independently of any knowledge of the effect produced by alcohol in the minute circulation of the blood, it began to be doubted whether alcohol was disposed of in the organism by its combustion. Some observers had noticed, in conducting the examination of the body after death from excess of alcohol, that the odour of the substance was present in the tissues, especially in the nervous tissue, and it was doubted whether the alcohol might not under some circumstances remain in the organism without undergoing any change at all. In 1860 two eminent Frenchmen—Lallemand and Perrin, assisted by Duroy, published a prize essay on alcohol, in which this view was maintained, or, as the authors would probably say, was originated; for in truth they were the first to state the view on direct scientific evidence. From the result of many experiments, they came to the conclusion that alcohol taken into the living body accumulates in the tissues, especially in the liver and in the brain, and that it is eliminated by the fluid secretions, notably by the renal secretion, as alcohol. They sought in the different tissues for evidence of the secondary products of the oxidation of alcohol, for aldehyde, acetal, acetic acid, and they found none of those products, except some acetic acid in the stomach, which acid they concluded was formed from the alcohol received directly into the stomach, and from the action exerted upon it there by the gastric juice. The experiments carried on by these inquirers were so numerous and careful, and the results they arrived at were so definitely stated, that their labours were for a season accepted as conclusive by many men of science, and by the majority of the public. It was ascertained by other experimentalists that alcohol is eliminated by the system in the direct way, as alcohol, and the question of elimination rested as if it had been solved.

The interval of credence in these assertions was not very prolonged.

From Dr. Anstie came the earliest expressions of doubt relative to this hypothesis of what is called the direct elimination of alcohol by the secretions, and from him have come the latest objections. His arguments have been sustained abroad by Schulinus, and, in this country, by Drs. Thudichum and Dupré. The sum and substance of the labours of these observers is stated in a few words. They prove that while it is true that, under certain circumstances, alcohol taken into the body will pass off in the secretions unchanged, the quantity so eliminated is the merest fraction of what has been injected, and that there must be some other means by which the spirit is disposed of in the organism.

In the course of some researches I had to make for reports rendered to the British Association for the Advancement of Science, it became part of my duty to ascertain what effect certain chemical agents exert over the animal temperature. Amongst these agents was alcohol.

The progressive stages of change of animal function from alcohol are four in number.

In the first stage (that of excitement and relaxation of the blood vessels of the minute circulation) the external temperature of the body is raised. In birds —pigeons—the rise may amount to a full degree, on Fahrenheit's scale; in mammals it rarely exceeds half a degree. In man it may rise to half a degree, and in the confirmed inebriate, in whom the cutaneous vessels are readily engorged, I have seen it run up to a degree and a half. In this stage the effect on the extremities of the nerves is that of a warm glow, like what is experienced during the reaction from cold.

The heat felt in this stage might be considered as due to the combustion of the alcohol: it is not so; it is in truth a process of cooling. It is from the unfolding of the larger sheet of the warm blood and from the quicker radiation of heat from that larger surface. During this stage, which is comparatively brief, the internal temperature is declining; the expired air from the lungs is indicating, not an increase, but the first period of reduction in the amount of carbonic acid, and the reddened surface of the body is so reduced in tonicity that cold applied to it increases the suffusion. It is this most deceptive stage that led the older observers into the error that alcohol warms the body.

In the second stage, the temperature first comes down to its natural standard, and then declines below what is natural. The fall is not considerable. In birds it reaches from one and a half to two degrees. In other animals, dogs and guinea pigs, it rarely exceeds one degree; in man it is confined to three-fourths of a degree. In a room heated to 65° or 70° the decrease of animal temperature may not actually be perceived; but it is quickly detected if the person in whom it is present pass into a colder atmosphere, and it lasts, even when the further supply of alcohol is cut off, for a long period, viz, from two and a half to three hours. It is much prolonged by absence of food.

During the third degree the fall of temperature rapidly increases, and as the fourth stage is approached it reaches a decline that becomes actually dangerous. In birds the reduction may be five degrees and a half, and in the other animals three. In man it is often from two and a half to three degrees. There is always during this stage a profound sleep or coma, and while this lasts the temperature continues reduced.

It is here worthy of incidental notice that, as a rule, the sleep of apoplexy and the sleep of drunkenness may be distinguished by a marked difference in the animal temperature. In apoplexy the temperature of the body is above, in drunkenness below, the natural standard of 98° of Fahrenheit's scale.

Under favourable circumstances a long period is required before the body recovers its natural warmth after such reduction of heat as follows the extreme stage of alcoholic intoxication. With the first conscious movements of recovery there is a faint rise, but such is the depression that these very movements exhaust and lead to a further reduction. I have known as long a period as three days required, in man, to bring back a steady natural return of the full animal warmth.

Through every stage, then, of the action of alcohol—barring the first stage of excitement—I found a reduction of animal heat to be the special action of the poison. To make the research more perfectly reliable, I combined the action of alcohol with that of cold. A warm-blooded animal, insensibly asleep in the third stage of alcoholic narcotism, was placed in a chamber, the air of which was reduced in temperature to ten degrees below freezing point, together with another similar animal which had received no alcohol. I found that both sleep under these circumstances, but the alcoholic sleeps to die; the other sleeps more deeply than is natural, and lives so long as the store of food it is charged with continues to support life. Within this bound it awakes, in a warmer air, uninjured, though the degree of cold be carried even lower, and be continued for a much longer time.

One more portion of evidence completes the research on the influence of alcohol on the animal temperature. As there is a decrease of temperature from alcohol, so there is proportionately a decrease in the amount of the natural products of the combustion of the body. The quantity of carbonic acid exhaled by the breath is proportionately diminished with the decline of the animal heat. In the extreme stage of alcoholic insensibility,—short of the actually dangerous,—the amount of carbonic acid exhaled by the animal and given off into the chamber I constructed for the purposes of observation was reduced to one-third below the natural standard. On the human subject in this stage of insensibility the quantity of carbonic acid exhaled has not been measured. But in the earlier stage of alcoholic derangement of function the exhaled gas was measured with much care by Dr. Edward Smith, who found that the amount of carbonic acid was reduced in man, as I have found it in the lower animals, so that the fact of the general reduction may be considered as established beyond disputation.

We are landed then at last on this basis of knowledge. An agent that will burn and give forth heat and product of combustion outside the body, and which is obviously decomposed within the body, reduces the animal temperature, and prevents the yield of so much product of combustion as is actually natural to the organic life.

What is the inference? The inference is that the alcohol is not burned after the manner of a food which supports animal combustion; but that it is decomposed into secondary products, by oxidation, at the expense of the oxygen which ought to be applied for the natural heating of the body.

There is nothing in what we see relating to the action of alcohol in man that would lead us to suppose it capable of giving an increased muscular power, and it is certain that animals subjected even for short periods of time to its influence lose their power for work in a marked degree. I thought it, nevertheless, worth the inquiry whether at any stage of the alcoholic excitement living muscle could be induced to show an extra amount of power. I therefore submitted muscle to this test. I gently weighted the hinder limb of a frog until the power of contraction was just overcome; then by a measured electrical current I stimulated the muscle to extra contraction, and determined the increase of weight that could thus be lifted. This decided upon in the healthy animal, the trial was repeated some days later on the same animal after it had received alcohol in sufficient quantities to induce the various stages of alcoholic modification of function. The result was that through every stage the response to the electrical current was enfeebled, and so soon as narcotism was developed by the spirit, it was so enfeebled that less than half the weight that could be lifted in the previous trial, by the natural effort of the animal, could not now be raised even under the electrical excitation. In man and in animals, during the period between the first and third stages of alcoholic disturbance, there is often muscular excitement, which passes for increased muscular power. The muscles are then truly more rapidly stimulated into motion by the nervous tumult, but the muscular power is actually enfeebled.

A CLASSIFICATION OF ABSTAINERS.

My argument is, that in every respect the practice of total abstinence is the best. There is a difference between the two practices which is as distinct as the difference between light and shade; but the difference must be seen, and, I must add, must be felt, before it can be fully realized.

For some years past now I have been able, on both grounds named, to study the necessary comparison. I have seen the effects of alcohol ever since I have been in practice. In later years, I have seen also, and learnt from seeing, the practice of abstinence, and the conclusions that have been forced on me are as definite as any study of natural phenomena could possibly demonstrate.

The abstaining class present somewhat differing conditions of health in relation to abstinence. They are made up of different representatives of the class. There are some amongst them who have been so fortunate as never to have tasted alcohol in any form; there are others who have renounced alcohol early in life, or who, being old, have long renounced it. There is a third class in which the renouncement has become settled, but has been of moderate duration. There is a fourth group made up of those who are in a state of probation, who are trying for some reason or other to live free of the fascination. Objectively, all these classes are healthier than those who are given to the indulgence, They show a cleaner bill of health in the regularity of the secreting processes, in the tone of pulse, in the steadiness and firmness of muscle, in the regularity and serenity of mind. Subjectively, they are not so distinctly healthy. Those of the first two classes are, but those of the two last classes are not.

They who have only recently given up alcohol, though they be firm of purpose, have still a desire to return to alcohol.

They tell you it is a foolish desire, and they wonder why they should feel it, but they do feel it. In fact they have become changed into the physical alcoholic constitution. Their vessels have undergone change from the action of alcohol, which, like a wedge, has found its way, causing distention. Their mucous surfaces have become accustomed to the taste and stimulation of the alcohol, and the impression so made is very determinate. Their nervous system has become habituated to the stimulation, and automatically calls for it. All these influences render abstinence difficult, and perhaps they never quite pass away.

The probationers, subjectively, are still more affected. Their experience of abstinence is painful, and they sometimes attribute to it every symptom they feel of an unpleasant character, but especially weariness, and a certain want of power in the heart, which to them is most distressing. If they are men of courage and of resolute will, they fight this out, and win. If they are deficient in these attributes they fall back, and on one pretence or another return to the stimulant.

To the medical profession this class of probationary abstainers is a calamity, for the members of it are never so happy as when, by a skilful artifice they can extort from one of our fraternity the permission or direction to return to a stimulant. This permission they consider the safest of all pretexts for indulgence; and much of the obloquy which the abstaining world throws upon the faculty, for its so-called recommendation of stimulants, rests on such intentional or accidental misrepresentation. Nor is it the poor or uneducated, or uninfluential, alone, who will thus try to make the physician the minister to their nervous desires; persons of the highest positions will try the same method, use the same artifice, and can boast afterwards that they have succeeded in pitting one doctor against another until they have bought their indulgence.

CHAPTER VI.

OBJECTION TO ABSTINENCE.

IT is commonly urged against practised abstainers that they partake of more food, and require more food, than do those who indulge in alcohol, from which it is conveyed inferentially that alcohol is therefore a food.

Another common statement is, that practised abstainers are men of melancholy moods, that they want vivacity, and wit, and sparkle; that their firesides are cheerless, and all but inhospitable.

If these sayings were true, they would, I admit, indicate the presence of an unhealthy condition, both of body and mind. In fact, they are open and ignorant falsehoods, offsprings of prejudice and superstition—words, words, words. I do not wonder at others believing in them, for I once believed them myself. Now I know, from the best source of knowledge—direct observation of fact—that they are what they are—untrue. For a month at a time I have sat at the table of hospitable strangers, changing residence often daily, and meeting large parties each time, at which all forms of alcoholic drink was excluded. It was the result of my observation, that at all these parties less food was taken, less luxury of every kind indulged in, much less amount of fluid imbibed, and in return, more genial mirth, and more steady happiness displayed, than amongst any other companionship in which I have moved. It is quite true that mirth is less extravagant at such times, and more chaste, and that disputation on subjects which excite keenest dispute, such as politics, is less intense, dogmatic, and quarrelsome; it is quite true that passion is more subdued. That those refinements are soon found to be the completest practical attainment of happiness, and to be worth all the rest.

My proposition, then, on the subject of the practice of total abstinence in health, would be that it carries with it every advantage, even by the side of the systematic minimized enjoyment of alcohol. By the side of the maximum injuries that come from, and so often spring from, that minimized enjoyment, the acquired craving for the cause of the enjoyment, and the unutterable miseries of its second, third, and fourth passages to disease, crime, and death, the advantage of total abstinence from alcohol is as a passage from death to life.

CHAPTER VII.

THE BLESSINGS OF ABSTINENCE.

THROUGH every class of society into which the principles of total abstinence have penetrated, and in which they have taken steady root, these experiences (of benefit) abound. What is more, they abound without any alloy. No man, woman, or child who has once fairly tested these principles feels anything but the goodness of them. The taste for the lost constituent of the sewer once broken completely, or better still never known, is never dreamed of as a necessity of daily existence; nor is the experience thus described limited by rank or social position. The rich man tells you how much more easily his own wants are supplied, and how much more intelligently and safely they are administered to by abstainers. The officer in command of a regiment of abstaining soldiers, or crew of a ship, tells you that his labours are reduced to such an extent that they become a pleasure as well as a duty. The superintendent who has numbers of abstaining workmen under him, tells how men sing at their labour who once cursed, and grumbled, and quarrelled. The workman takes you to a home and fireside to which he need not be ashamed to invite the wisest and best of the land; a home in which thrift insures security of possession, security of happiness, happiness hope, and hope prosperity, with certainty of promotion in the social scale.

CHAPTER VIII.

EXCUSES.

IT happens that many who indulge freely in alcoholic drinks, and that some who indulge moderately, with a decided relish for the indulgence, excuse themselves on the ground of an inborn or hereditary infirmity, for which they allege they are not accountable, and over which they have no sufficient natural control. "I have a strong desire," says one, "to take to total abstinence, but my father and grandfather had such liking for drink, that the actual desire for it is, as it were, engrafted in my nature." "Alas! it is a family failing," says the friend of another person, "and he, or she, cannot grow out of it." So excuse upon excuse is offered, and the faithful inquirer who wants to obtain the precise truth has to get to the bottom of it as best he can, by seeking out all the evidence with the utmost circumspection.

It turns out, in a great number of cases, that the evidence supplied does not support the excuse at all, but that the excuse is really made in order to explain away, plausibly, the weakness of him, or her, who has made it. It turns out, in other examples, that the excuse carries with it an exaggerated view of the proclivity and is used for the purpose of acting as a salve to the conscience of the person who offers it.

In a third class of persons, who allege the proclivity, an excuse is presented that is plausible, but is not positively sufficient. In a fourth class the excuse is valid, and to a large extent sufficiently valid, to account for much that has occurred, and is occurring. Lastly, I believe there is a small class of examples in which the proclivity amounts to a true insanity, and in which it renders the afflicted actually irresponsible when the temptation to drink is thrown in their way.

CHAPTER IX.

PALE-FACED ABSTAINERS.

IT has been one of the reproaches thrown out by ordinary society against total abstainers from alcohol, that they, the abstainers, are pale and white-faced; that they are deficient in colour, therefore —so runs the argument—deficient in blood, or in some quality of blood. It is true that many abstainers are pale when compared with alcoholic drinkers, and it is observable that, at a common table, where some who take wine and with some who do not take wine, the difference of the two classes may be very easily detected. Those who laugh at the abstainers for being pale would be warranted in laughing if it were the fact that the red face they so much admire were indicative of health, and the pale face indication of disease. Unfortunately for their side of the case, that suffused face, that jolly red face, that dark red face, is the face of disease, while the pale face is as nature meant it to be. Unfortunate, also, for the laughers, is the fact that the red and suffused and dark-facedness of the alcoholic is not simply skin deep, and confined to the face—the same redness extends to more vital surfaces—the surfaces of the brain and other vital organs are congested in like manner, according to the degree of injury that has been inflicted on the blood-vessels by the paralyzing drink that is accredited with so much usefulness.

CHAPTER X.

DEBILITY.

THERE are many in the great alcoholic population who are fain to use alcohol in order to relieve debility arising from some drain or loss to the system. Mothers who are nursing their children are typical examples of this kind. When such mothers are improperly fed, when they are underfed, when they are overfed, or when they are fed on sufficient quantity but indifferent quality of food, they are given frequently to feel low, as they urgently express it; to feel as if life would be intolerable and impossible unless it were relieved. In this emergency they fly to the ever-tempting, ever-ready alcoholic potion. The rich woman has at hand the luscious Madeira, "or the mis-named genuine" port, or the full-bodied sherry, or the sparkling champagne. The poor woman has the "nourishing" stout or the rich-brown ale, or the vilest of products—the "nip" of gin, rum, whiskey, or brandy. To these, one or other of them, the sinking woman flies, and in a few minutes the distress, the weariness, the faintness, has passed away. She is as a drowning person, who has come up to the surface, has caught a floating bundle, and holding by it breathes again. Alas! in a brief time, the support begins to give way, and the victim with it. She falls once more into the helpless state from which she started. She resorts once more to the promised relief. She loses power and resorts again to the treacherous aid. In due course of time, and, indeed, I may say, in the due course of nature, she becomes a new organization altogether, an organization living on a different plan from that in which she was originally projected, coming under a new series of laws of life, passing through a new series of organic changes, and dying at a period different from that which was positively designed for her course. Thousands of women annually fall into premature death from this mode of living under emergency, and there is no cause for wonder at the fact. That fluid on which they had relied had in it nothing at all on which their structural life could be sustained, except a little sugar in some of the drinks, and the water which formed the main body of the fluid. The action of the alcohol throughout was but an agent that relaxed the vessels, taking off friction for a brief period; that set the feeble heart for a short time free; that seemed by the flush of life that appeared on the surface to communicate life, but that really wore out every organ it influenced, and chiefly the heart, without supplying a figment of strength, health or vitality.

CHAPTER XI.

IS SUDDEN ABSTINENCE SAFE?

IN relation to the subject of sudden abstinence from alcohol, and the effects produced, we have much collision between the two forms of evidence, subjective and objective, that are put before us for observation. A great number of persons who have tried to give up alcohol, as they depose, declare that the sudden deprivation of the agent subjected them to such symptoms, that if they had persisted, certain consequences of the most serious character would, they believe, have followed. They, therefore, did not persist, and so escaped the consequences.

You will see at once the fallacy of this subjective argument. It is an argument on the danger of consequences which never occurred, and which, as far as we know, never would have occurred. One of my friends told me quite recently that if he had persisted in abstaining he should have become paralyzed. His doctor bid him abstain because of some want of correct muscular action, which was possibly induced by alcohol; but if he, the patient, had gone on with the treatment he should have "dropped into palsy." "But did you drop into palsy?"—I inquired. "No! he stopped short of that by going back to alcohol." This is a perfect specimen of the subjective logic in which every passing symptom is magnified into a belief of some terrible danger, which does not come, because it is put off by giving up the practice, and which, as it never comes to those who have the courage to hold on to the practice, cannot be accepted as a danger at all.

To get at the full truth, therefore, we require to have objective evidence, distinct from subjective altogether. We want a grand experiment in and by which it shall be determined whether any diseases recognizable by objective science, which all can see and understand, do occur from the sudden deprivation of alcohol. The experiment would be formularised in this manner:—Take a sufficient number of persons, say a thousand or more who are drinkers of alcohol. Without any preliminary preparation cut off alcohol from them absolutely; never mind what they say they feel; never mind what they say they fear; never mind what they declare must happen, if they are not supplied with this great and urgent necessity. For once be cruel to be kind with a vengeance. Then observe carefully, and if, in the course of observation, it be found that any number of these deprived beings really suffer from the deprivation, or if any number fall into paralysis, consumption, insanity, or other of the dreaded and fatal diseases, as a clear result of the enforced abstinence, the evidence will be against abstinence so far. It will prove that alcohol, which produces so many diseases cannot be left off suddenly without some risk to health and life. This experiment has been done, and is being done, on a much larger scale than is suggested above. The gaols of this country, which have been the schools of so rich a store of sanitary knowledge, have been also the experimental grounds of the experiment which we wanted to institute for the fact we were fain to know. Into these gaols are carried men and women in all degrees of alcoholic existence; within the walls of these institutions alcohol finds no place; once there, whole populations of drunkards and moderate drinkers are deprived of strong drink without hesitation, without mercy—yes, without mercy. Do they, who are thus treated, fall as a result of the enforced abstinence into the diseases so dreadful and so dreaded? They are not allowed any sturdy food of other kinds to replace alcohol in their great emergency. Do they collapse? Do they fall into consumption, or insanity, or palsy? If they did there would soon be a ferment in the country that would level the gaols and put a brandy flask to the mouth of every sufferer, prisoner though he were. I for one would join the helpers heartily, with brandy-flask in hand. But the solemn fact is, that those enforced abstainers become, under abstinence, as a leading cause of the fact, the healthiest of the community, while no one has been able to spot a single definite serious disease as due to the deprivation of alcohol.*

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* An observation of the facts stated above has been the means of bringing over to the cause of abstinence some earnest and useful advocates, among whom was the late Rev. Thos. Hutton, M.A., once chaplain of Northampton County Gaol. Prisoners knowing they cannot get strong drink do not dwell upon it, whereas, in other cases, a knowledge that it can be obtained often encourages a brooding over the absence, and a nervous feeling of loss and suffering from its abstention.—Ed.

CHAPTER XII.

ALCOHOL AND HASCHISH.

NATURE gives us for nourishment all we want in proper foods, but in so giving to us direct from her own hands, she gives us no food whatever that creates insatiable desire for itself—strange impressions; senses of urgent necessity for one thing, and no other thing; superstitious fear of abstinence from one thing, and no other thing; automatic demonstrations for one thing, and no other thing. Milk is the first food we live upon, and is a standard of foods, but whoever felt a sensation ineradicable, from the tasting or drinking of milk? or the sense of necessity for milk and no other thing? or the fear of abstaining from milk lest something dreadful should happen? or the institution of automatic phenomena from the imbibing of milk, so that whatever else may not be had and possessed, milk must be? Whoever heard of a man lifting his hand to his head too often with a glass of milk? The fact lies, indeed, on the other side. Nature makes the animal grow weary, and, satiated by too frequent repetition of her own gifts, lest they should injure, from too constant use, and beget a carelessness for variety, which, in presence of all her bounty is indispensable. See in this how alcohol stands out from the natural ordinance. If alcohol stood forth as a necessity, what an all-absorbing and destructive necessity would have been put in the first position of necessities! Nature would then have designed a thing that systematically kills, that creates a new order of short-lived beings, to be killed by her produce. Let us look at this argument by the side of another. In Eastern countries, a number of men and women too, I believe, partake of an organic product prepared out of the vegetable world by a process still simpler than that by which man prepares alcohol out of the vegetable world. This substance is commonly called *haschish.* This intoxicant, like alcohol, is given to man indirectly by Nature. As a food it has just the same claims as alcohol has. As an intoxicant it has better claims. The drunken frenzy it excites is finer, the oblivion of care deeper, and physical injury to the body is less. When it is regularly indulged in, it sets up desire, it sets up necessity for itself, it banishes fear, it leads to repetition of action. Are not the defences for it just as good as the defences which are so commonly set up for alcohol? If alcohol be a gift from on high, as it is claimed to be, so is haschish. If alcohol be a divine gift, haschish is diviner. I contend against both in the light in which they are put as necessary gifts, and I place them together most fairly for the purposes of the inferences I am forced to draw as to their true place in Nature.

These inferences are (*a*) That the physiological action of these agents, if the use of either of them were persisted in universally, would lead to a new physical and mental development of the human race. (*b*) That for the support of such a race there is no sufficient provision in the scheme of Nature as it is now before us, and, as far as we can see, no object or intention of a natural kind, because the end of such a race would be universal insanity and death.

CHAPTER XIII.

IS THERE A "NATURAL CRAVING" FOR ALCOHOL?

[THE following is extracted from "Dialogues on Drink," in twelve chapters, written by Sir Benjamin Richardson for the Scottish Temperance League, and published at their office in Hope Street, Glasgow. The imaginary interlocutors are Helena and her husband, Juridicus, and a friend, whose pseudonym of "Physicus" is a thin veil for the author himself. The original is, in a few passages, slightly abridged.]

Juridicus. What have you prepared for my unfortunate friend on that inquisitorial paper of yours?

Helena. Half-a-dozen questions, at least. The first, Juridicus, is one which your conversations with me have suggested many times. It relates to what is called the craving for a stimulant.

Juridicus. That is a very good subject. We could not have a better. I know of no argument for alcohol more powerful than the natural craving which all men and nations seem to have for some form of nervous stimulant. I remember a reference to that point in an admirable article in the *Times*. The writer said, that it is of little use to cut off the supply of alcohol, and to leave the craving for it as violent as ever!

Helena. Which argument would no doubt leave all measures of prohibition useless; because no law can touch a natural craving.

Physicus. I should say that the writer simply put the cart before the horse. I mean that if there was no supply to prohibit, there would be no craving to satisfy.

Juridicus. You surely do not contend that the stimulant produces the craving, and that the craving for the stimulant does not pre-exist in the man.

Physicus. That is my precise meaning; and it is the true reading of the difficulty you have raised.

Helena. But wherever man has existed almost, he has sought some solace to this craving. One savage nation has found it in alcohol; another in bang or hashish; a third in the poisonous or narcotic fungus, the amanita muscaria; a fourth in tobacco; a fifth in the coca; a sixth in the red-thorn apple; a seventh in opium, and so on. It could hardly, I think, be maintained that all these nations learned their craving from the thing craved for.

Juridicus. Impossible. The finding and using of the stimulant is obviously, as it has been well described, "the interpretation and declaration of a natural instinct peculiar to man."

Physicus. I do not wonder at your decisive mode of settling this question. For all that, I feel quite secure in my position, and shall be much surprised if I do not bring you into it. But we must proceed by analysis, step by step, and you must pardon me if I am sometimes tedious.

Helena. Oh, pray, let us have a complete mastery of this difficulty, if it can be arrived at. Its solution is a foundation for or against alcohol. It has been so dunned into me, from the hour I could reason until now, that a nervous stimulant of some kind was a natural necessity for man, and that the craving for such an agent was an instinct like the instinctive desire for food and air, that it is a part of my own nature to believe the statement unassailable.

Physicus. I can imagine that; and therefore the greater must be my care in disabusing your minds of what I conceive to be a natural error. To begin, then, I must ask your assent to one or two propositions bearing directly on the subject. You urge that aboriginal races of men in various parts of the habitable world have evinced this craving for a nervous stimulant, and have therefore found it. If that rule applied to all, as to a natural instinct like the desire for food, there should be no exception to the rule. No men have been found who did not desire to eat and to drink.

Juridicus. We do not suppose there have been.

Physicus. But there have been notable exceptions in respect to the instinct for the nervous stimulants of which you speak; and as one exception is as good as fifty, I name the most striking. The New Zealanders never showed any instinct of the kind until we went to them and introduced alcohol.

Helena. The evidence on that point is indisputable, I know.

Physicus. Then you must allow that all people have neither the instinct nor the desire until they have acquired the desire by coming into contact with the thing that calls it into action.

Juridicus. They might have had the desire, and yet not have had the intelligence to find the stimulant.

Helena. Or the country in which they lived might not have afforded the stimulant, so that search for it would have been useless.

Physicus. Is it compatible with your reason that savage men and women originally went about searching for a nervous stimulant, in the same way as they went about searching for water, or animals, or fruits on which to feed, or for places in which to take shelter?

Juridicus. No; but in searching for one they found the other.

Physicus. That is entirely a different thing, and that is kept up to this day. It is my argument, that they by accident found these stimulants, and acquired their use, and created the desire. But that clearly could not be a necessity which was not sought for as such, and was found only by accident in searching for necessities.

Helena. I see the position. In like manner you would contend that a country which did not produce a stimulant, would not be a country in which man could be provided for, or in which he could survive, if the stimulant were absolutely a necessity of life.

Physicus. I should contend for that position, and I do not see where it is at fault. If the nervous stimulant were an absolute necessity for one man, or one race of men, and if the craving for it were the interpretation of that natural desire, then it would be also a necessity for all men, and the craving would be common to all, and the stimulant would be common to all; just the same as water, and food, and air are necessities in common, and are supplied in common.

Juridicus. You reason on man as if he were one of the beasts that perish; as if he required, like them, merely so much water, so much air, so much food. If man were a mere animal, your argument would tell with all the force you wish to claim for it. But man requires more; and this very craving which we are talking about is proof direct of the requirement.

Helena. That truly is very peculiar. It is only the higher animal, man, with his finer nervous organisation, who requires the nervous stimulant or craves for it. You never find a domestic animal, however highly trained, asking for a nervous stimulant, which looks as if the higher nervous organism demanded the stimulant because of the higher duties for which it is designed.

Physicus. According to that, there are degrees of comparison in the requirement for the nervous stimulant. The higher the duty imposed on the nervous organisation, the greater the necessity for the stimulant. If the first savage who built a wigwam required a gourd full of a stimulant,—say of wine,—Sir Christopher Wren should have required an Atlantic of wine in proceeding to build St. Paul's Cathedral.

Juridicus. A skilful thrust, but not quite home. We mean that between the lower animal and man,—even between the highest of the lower animals and man,—there is a line of demarcation over which the craving for the stimulant does not go. Therefore the man requires the stimulant for the full development of his higher powers, or the craving would not be so decidedly manifested.

Physicus. Therefore, the man who does not take a stimulant, and has no craving for it, is more incapable of the same amount of nervous work, of the finer kind, than is he who has the natural craving, and who gratifies it.

Juridicus. You are opening another question altogether. Let us keep to that we are upon. We were comparing the inferior animals and man in respect to the instinct we desire for stimulants.

Physicus. We were; and I am quite willing to follow up the comparison. I was, in fact, about to put it as one of my propositions to you. Do you maintain that the lower creation differs from man in any degree in respect to the craving?

Helena. Why, that is the distinction between the two; the one has the craving instinctively, the other has it not.

Physicus. What if both had it, the one as strongly developed as the other. Would the higher nervous organisation of man afford any longer the explanation for the craving?

Juridicus. Certainly not. But the proof of the craving in the lower animal is first demanded.

Helena. And it must be proof upon proof before it could influence me.

Physicus. You shall have as many proofs as you please, if you will for a few minutes lend me your attention, and accept my evidence. When I was conducting my researches on the influence of alcohol on the animal temperature, I fed pigeons on peas that had been soaked in a solution of alcohol. At first, as is the case with the human subject, objection was taken by the birds to the foreign substance in their food, and, in a few instances, the wiser birds objected to it altogether. But others, so far from objecting, soon acquired a taste for the foreign substance, and became decided alcoholics. They quickly were made sleepy, drowsy, and, in short, diseased animals. For that they did not care. The alcoholic constitution once pronounced on them, they were fond of the luxury that led to it; and if they could have talked to their abstaining fellows, what arguments they might have used. Happily for the world that feeds on pigeons, they could neither talk nor argue.

Helena. You give us a very strong case, in so far as birds are concerned.

Physicus. A horse will learn to drink beer. One day, when I was riding in a hired carriage near to Canterbury, the horse stopped short at a wayside public-house. I asked the driver what that was for. "The horse," said he, "always stops here for his beer; he wouldn't go by on no account: you couldn't whip him by, sir, till he has had his beer. His former master taught him to drink beer, and invariably treated him to it at this house, and here he'll stop till he gets it." It was the fact. A large tankard of beer was brought out for that horse, and he disposed of the fluid with as much relish as his master, and then went his way. "It's a shame," added the driver; "but young fellows from London, who like a joke, and who also like beer themselves, will sometimes give him a lot, and make him very drunk. Then he is awkward to drive and weak for two or three days afterwards, and we have to give him more beer to keep him up, which costs a lot."

Juridicus. I am aware, now you recall the point to my mind, that horses will acquire a craving for stimulants. When I was shooting in the Highlands, in 1850, there was a keeper who had a Highland pony called "Toddy," which got its name because it would drink cold toddy at any hour of the day, and would run after the drink when it smelt it. One day we made the animal quite intoxicated, so that we couldn't use him, and had to leave him to sober down. But I am interrupting your narrative.

Physicus. In some parts of the country it is the custom still to feed fattening calves with what are called gin balls. A portion of barley flour is made into a paste, and to the paste a measure of gin is added. The gin paste is then made up into rolls, and the calves are fed with the rolls, much in the same way as the traveller Bruce recorded that the Abyssinian lords were daily fed by their faithful wives. After this refreshing meal the calves are for a short time frisky and wild in the darkened warm cells in which they are placed to fatten. But soon they go down on their knees, and get exceedingly drowsy, and then do not rouse again nor care for anything until the next meal comes round. "They take very kindly to gin balls," a feeder of calves told me. "They like them better than anything else; and the gin keeps them so quiet, they are fattened up in half the time, in the dark. If we didn't give them gin, they would get restless in the dark, and wouldn't get fat."

Juridicus. I have seen the same process in the part of the country where I was born, though I have not followed it up so minutely. The evidence seems to favour the view that the alcohol causes rapid fattening of the animals,—in which sense it is food. You must make a note of that, Helena, if you please for a future reference.

Helena. I will. But, perhaps, Physicus has yet something more to offer us in the way of illustration, derived from other and different facts, which he has observed in the course of his investigations.

Physicus. I have one or two more facts which may interest you. Some years ago, when I was giving a lecture on the action of anæsthetic vapours, I had a pigeon which would walk into an anæsthetising chamber, of its own accord, as readily as it would go into its cage, or climb on to its perch, and which would compose itself to the anæsthetic sleep at once with the most perfect equanimity. To the lookers-on this proceeding of the bird was a source of astonishment. The truth, however, was, that the animal in question had acquired a liking for the anæsthetic vapours. Like all regular topers, it had particular tastes, and preferred the vapour of methylene bichloride to that of ethylic ether or amylene. But in the absence of one vapour, it would always put up with another; and when it was brought near the narcotizing box, it would fly to it, and get into it as quickly as it could, and the more eagerly if any odour of vapour were diffused in it. I give this as one illustration, because it was so distinctly marked, and will be so well remembered by many who attended my demonstrations. It is, nevertheless, only one of its kind, and is not exceptional in any degree. There is, I believe, no domestic animal that could not be taught to acquire the craving for intoxicating drinks and for intoxicating vapours.

Juridicus. You make the craving, by your argument, a mere matter of education, extending to all animals that can be educated.

Physicus. I do; and I accept the fact as proof direct against the idea of connecting man specially with a stimulant, as if he alone wanted it. If this proof were not in my hands, I should be disposed to think there was something in the argument. If to learn to crave for wine or other strong drink were an act confined to man, as the special phenomenon of the act of speech is, the experience would possibly suggest that wine was made for man alone. It happens in this case, however, that the strangeness of the phenomenon in relation to drink does not hold good. The lowly animals,—the cat, the dog, the horse, the calf, nay, even the pig and the jackass,—can learn to enjoy good drink equally with man.

Juridicus. If the day should ever come when, under the extending guidance of man, the alcoholic constitution shall be generally introduced into the ranks of the lower animal kingdom, it is difficult to forecast what developmental changes will take place.

Helena. That truly will not be the day when "the wolf shall dwell with the lamb, the leopard lie down with the kid, the young lion and the fatling together; and a little child shall lead them."

Physicus. But of what import is that? If it be good that man shall possess for himself all the advantages which, up to this present time, have only been exceptionally possessed by the beast, why should the beast be deprived of the improvement? It is the duty of man to improve the life standard of every useful thing of life that is under his command. Let him be logical, and extend the improvements inflicted by alcohol, assured that whatever there is that is good in it, will be reflected back again to himself a thousand-fold, in proportion as that goodness is extended to the world of creation beneath his own.

Juridicus. My dear Helena, I feel that we must so far give way to our friend as to admit that the desire for a nervous stimulant is not an innate faculty peculiar to man alone.

Helena. And that it would not be overwise to cultivate the faculty in animals lower than man.

Physicus. Pray go a step further, and throw in the lower order of man also.

Helena. I will give you that point.

Juridicus. And I will not. I am too old a pleader to be caught in that trap, my clever antagonist!

Helena. Why not?

Juridicus. What is a lower order of man? Admit such an order, and you must define what you mean, by which he will lead you to throw in every man, woman, and child in creation. "Beware, beware, he's fooling thee!"

Helena. I confess I don't see it. If the use of the nervous stimulant is to supply a want to the nervous system, it must be most required by those who are most exalted above the lower creation, and least by those who are least exalted.

Juridicus. So that none except philosophers really should have wine. That is what your admission leads to inevitably.

Physicus. I should be sorry for it to rest even at that advanced point. I should like to show you that philosophers may safely be excluded also.

Juridicus. Precisely. That is the helpless point you wish to bring us to, and then you are satisfied. But you must wait. I have not yet quite mastered this curious subject of instinctive desire for a stimulant. Admitting, as I must, that the desire may be taught and learned, it yet seems always to be so readily supplied to man that he is, as it were, forced to acquire it, and afterwards impart it.

Helena. That is to say, the agents are always put into our hands in a manner too natural to be foreign to our tastes. What says Physicus to that view of the case?

Physicus. That it is equally as fallacious as the view of man being specially teachable. The truth is that it matters not how far the agent may be from the possession of man, he may still be educated to crave after it when it comes. It may be as artificial as you please, and yet as desirable.

Juridicus. But it must, in all cases, have one property common to all of its class, it must be a stimulant.

Physicus. No, even that is not necessary. You, Helena, enumerated on the last occasion a number of substances, alcohol, bang, opium, tobacco, coca, thorn apple, amanita, to which I could add many more. To the whole of these a desire can be attached, and a craving of the most intense kind. But when you come to consider the action of them on the body, it is as different as it can possibly be. One agent depresses the heart, another quickens it. One induces sleep, another induces a peculiar wakefulness. One is evanescent in its action, another slow and tedious. One excites laughter, another tears and melancholy. In a word, there is no uniformity of action at all; and if we admit one natural craving, we may as well admit a dozen, or any number that may be acquired, which number I know no end to, until chemistry has exhausted her stores of substances to be used and craved for.

Juridicus. But wine, after all, seems to have taken the first place.

Physicus. By accident of discovery that *may be* the fact, though there are many other agents which, had they been discovered before wine, might easily have replaced it, and have gained as wide an acceptance.

Helena. Amongst savage people it might be that some common narcotic would gain a place as a stimulant; but one can hardly suppose that a person of education and refinement would ever acquire a craving for anything except wine, or one of the allied alcoholic drinks. It is true, I have heard of the English opium-eater, De Quincey, and of one or two other eminent men who have been opium-eaters, but their examples are too rare to affect the general argument.

Juridicus. Far too rare, and also too doubtful. De Quincey took wine as well as opium, and most opium-eaters take it.

Physicus. I assure you that the very wisest men can acquire a craving for agents that are not alcoholic, and can learn to prefer them to alcohol in any shape. You will not consider Sir Humphrey Davy a bad authority on this question?

Juridicus. Assuredly not; but how does he come into the business?

Physicus. Sir Humphrey Davy conducted a beautiful and original research on the action of nitrous oxide gas on the living body.

Helena. You refer to the gas which dentists use in these days for making the body insensible to pain during the extraction of a tooth.

Physicus. The same gas. Sir Humphrey, indeed, first suggested its employment for the purpose of removing pain during surgical operations. I refer, however, now to his own personal experience as to the effect of the gas on himself. He inhaled it many times, and at last got such a craving for it, that he says a desire to breathe the gas was always awakened in him by the sight of a person breathing, or even by the sight of a gasholder.

Helena. Incredible!

Physicus. Yet most true. I have given you his own report, and I could confirm it by an experience very nearly the same.

Juridicus. Is there nothing exceptional in these examples?

Physicus. I can see nothing. In the north of Ireland the people of some of the villages have acquired the habit of drinking the light fluid which is called sulphuric ether, and in a short time their craving for that fluid is equally pronounced.

Helena. But how do they manage to swallow such a fluid? I have heard of the proceeding, but could not realize it.

Juridicus. When we were in Dublin, a very clever youth, whom we took for a medical student, told us about it with infinite humour, and yet with such minuteness of detail that we half believed him. He named a place called Draper's Town in the Maghera, where the practice is most rife.

Physicus. I have done better than your informant; I have been to Draper's Town myself, and have investigated the whole matter. It is quite as true that the ether drinker exists and has his cravings for his favourite drink, as that you, Juridicus, have your cravings for your favourite Mansanilla.

The succeeding dialogue treats of the effects of ether as compared with that of alcohol, and the subjoined, extracted from Dialogue 10, fitly concludes the argument on the question of "Natural Craving."

Juridicus. Is it the fact that in the natural constitution of the varied forms of life there is really no employment,—if I may with reverence make use of such a term,—of any agent that acts like alcohol or other of these intoxicating fluids?

Physicus. I have asked that question over and over again, and the answer is ever the same,—there is nothing of the kind. All vegetable life, all animal life, lives, develops, flourishes, passes through its various stages, and dies without a shade of natural provision for alcohols, or such intoxicating agents as necessary parts of their existence. All living creation is a vast water engine in a purely physical point of view, and nothing else.

Helena. And if that be so, then to interpose the use of any other agent is to interfere with the machine, and reduce the life-value of its individual parts.

Physicus. That is true. All such introductions, if for the moment they quicken the action, hasten the processes of life, and shorten the duration.

CHAPTER XIV.

ALCOHOL IN DISEASE.*

About 1871 I was very strongly influenced on this subject by certain observations made by the late Dr. Whitmore, Medical Officer of Health of Marylebone. I was a member of the Vestry of St. Marylebone, and we had in our parish a very serious outbreak of small-pox attended with a considerable mortality. In his report to us Dr. Whitmore stated that in his treatment of the earlier cases of the confluent and hæmorrhagic and malignant forms of the disease, stimulants of wine and brandy were freely administered without any apparent benefit; and that after consultation with Mr. Cross, the resident surgeon, he resolved to substitute simple nutriments, such as milk, eggs, and beef-tea at frequent intervals, with discontinuance of stimulants altogether. The result of the change was most satisfactory, and many bad cases did well which, he believed, would have terminated fatally under the stimulant plan.

Again, I was struck very much by a report made by Mr. Cadbury, in which that gentleman showed the course that was going on in our various hospitals. The amount of alcohol taken by the in-patients in twelve hospitals in London varied in ounces from 37,531 in one establishment, to 261,203 in a smaller one during the year 1878. I found too, from the same author, that the whole cost in St. George's

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* Extracted from a paper read at Croydon, November 13th, 1895.

Union Infirmary for the year 1878 was £8 3s. 6d., amongst 2,496 patients, while the cost of the same number at the average of the twelve hospitals was £124. About this same time I also remarked that in many of the public institutions of England there was a reduction something similar in kind, if not to the same extent, and that the number of persons who were treated seemed to make better recoveries than those who were taking the free amount of stimulant. The effect of these observations chimed in very remarkably with the physiological experiments it had been my duty to carry out and which tended to show in a most striking manner that the action of alcohol in the body differed widely from the ordinary opinion that had been held upon it, and thereupon, in my own practice, I abandoned the use of alcohol, and began to give instead small quantities of simple, nourishing, digestible food, a course I have pursued up to the present time with the most satisfactory results, results I have never felt any occasion to regret. By these steps, learned in the first place from the study of alcohol in its action on man, I was led to become a believer that alcohol is of no more service in disease than it is in health, and a lengthened experience in this matter has really confirmed the correctness of the idea. In course of time I was invited by the authorities of the London Temperance Hospital to become physician for in-patients, and a certain number of beds, not less than twenty-five, with any overflow, were placed at my command. I obtained in this way a large number of patients who were under my constant care, and I have watched them with all attention ever since.

The physicians or surgeons may, if they like, use alcohol in its medical character, but when they so use it they must write down specially that the alcohol was prescribed under peculiar circumstances, they must give the dose, they must properly state the number of doses administered, with the due proportion of the dose, and they must, without any hesitation, state the precise results arising from its service. I looked into this matter closely, and I am bound to tell you that I found the rule had been most rigorously followed, and that alcohol had not been actually prescribed at the rate of one administration a year during the whole period the hospital had existed.

I am led now to consider the results of the treatment that has been carried out under my care, results which I may say—in parenthesis—would be borne out in their practice by any one of my colleagues on the staff. In my time the beds have always been full. Every case has been carefully watched and reported upon, and I state at once that from the commencement of the time during which I have had the charge of patients I have not prescribed alcohol in any one case. I must state too, as bearing on this matter, that there has been practically in the Temperance Hospital no speciality of any kind, although it has been constantly the case that patients of all kinds, professed non-abstainers and professed abstainers, have entered our walls. It repeatedly happens that sick persons are brought because they are not abstainers, and, in short, no one is refused on the score of temperance or intemperance. All that we say is, "Who enters here leaves alcohol behind," and there we stop. No difficulty follows the carrying out of this rule; the habit prevailing in the place communicates itself, to all who are admitted, with so dominant a force that I have been but once solicited by a patient for any alcoholic drink. And, as we have no speciality for persons or for diseases that have to be treated, we have no speciality more than any other hospital for the remedies that are selected. We endeavour to keep up to the mark in treatment, but nothing more, our remedies being of the simplest and purest kind, differing only that they are made up without the use of alcohol. Our diet rule is simple, well prepared, and efficient. It is in four varieties—milk diet, middle diet (which includes light animal food, such as fish), full diet, and what we call, for particular cases only, fancy diet, a diet acceptable to, and at the same time suitable for, patients who can only take and digest special articles of food.

. . . It is admitted by some who have seen the new line of practice that they are astonished at the results, while, at the same time, they think that alcohol, having certain physiological properties, it is an extreme practice for a rigid enthusiast to omit it altogether in the treatment of disease. "Why not," say they, "why not use it exceptionally in its proper place?" My answer may be condensed as follows. This grand experiment is crucial, and must not be interfered with by fear or by empty faith. Now that my eyes are opened I do not object to alcohol as a medicine, if its value as a medicine can be precisely defined, but to one who is seeking knowledge, as apart from mere faith, it holds a peculiar position. If it be admitted as a necessity once, why not admit it twice, three times, any number of times? And if it be admitted in that way, what else can be inferred except that we are unable to do without it, a false inability that would destroy the whole value of the inquiry and leave alcohol triumphant. It is necessary to withhold alcohol altogether until it is shown that the sick are injured by the omission. As a fact derived from direct observation no injury has accrued from the course pursued. On the contrary, some good directly has been obtained, with enormous good, indirectly, if a false idea of ages has been in the slightest degree corrected. For although universal error often stands for practical truth, practical truth can never be established until it is emancipated from every species of error, however universal.

CHAPTER XV.

ANSWERS TO FOUR QUESTIONS.

QUESTION 1.—*Relating to the action of alcohol on the process of digestion.*—The common idea that alcohol acts as an aid to digestion is without foundation. Experiments on the artificial digestion of food, in which the natural process is very closely imitated, show that the presence of alcohol in the solvents employed interferes with and weakens the efficacy of the solvents. It is also one of the most definite of facts that persons who indulge even in what is called the moderate use of alcohol suffer often from dyspepsia from this cause alone. In fact, it leads to the symptoms which, under the varied names of biliousness, nervousness, lassitude and indigestion, are so well and extensively known.

From the paralysis of the minute blood-vessels which is induced by alcohol, there occurs, when alcohol is introduced into the stomach, injection of the vessels and redness of the mucous lining of the stomach. This is attended by the subjective feeling of a warmth or glow within the body, and, according to some, with an increased secretion of the gastric fluids. It is urged by the advocates of alcohol that this action of alcohol on the stomach is a reason for its employment as an aid to digestion, especially when the digestive powers are feeble. At best, this argument suggests only an artificial aid, which it cannot be sound practice to make permanent in place of the natural process of digestion. In truth, the artificial stimulation, if it be resorted to even moderately, is in time deleterious. It excites a morbid habitual craving for a stimulant: it excites over-secretion of the stomach and acidity, and in the end, it leads to weakened contractile power of the vessels of the stomach, to consequent deficiency of control of those vessels over the current of blood, to organic impairment of function, and to confirmed indigestion. Lastly, on this head, it is a matter of experience with me, that in nine cases out of ten, the sense of the necessity, on which so much is urged, is removed in the readiest manner, by the simple plan of total abstinence, without any other remedy or method.

QUESTION 2.—*Relating to feebleness of the circulation.*—The effect of alcohol on the circulation of the blood is to quicken the circulation. The heart beats more quickly after alcohol is imbibed; the vessels of the minute circulation are dilated, and at the same time are reduced in their contractile power. By continued use of alcohol, the vessels lose their control, and the heart loses its power unless the stimulation be renewed; at least the sense of want of power and of languor when the stimulant is withheld is transformed into what is conceived to be a natural necessity. The weakened stomach yearns first for what is called its stimulant, and then the languid body craves in response for the same. But the rapid course of the circulation leading to the increased action of the vital organs is, after all, but the rapid running out of the force of the body. It is like the rapid running down of the timepiece when the pendulum is lifted. The running down demands, in turn, the more frequent winding up, and the result is premature wearing out and disorganization of those organic structures on the integrity of which the steady maintenance of life depends.

During these unnatural courses of the circulation under alcohol, the degrees of structural change which occur are most serious. The vessels themselves are rendered feeble, irregular in action, untrue to their duty.

Another cause of feebleness from alcohol, indirectly connected with the circulation, is the change to obesity which alcohol induces. It is one of the effects of alcohol to check the natural process of oxidation in the body, and for this reason, as I have experimentally proved, it reduces the animal warmth. In later stages, and occasionally from the first, the fatty particles are deposited within the minute structures of organs, in the muscular structure of the heart, or in the substance of the brain or kidney. The fatty degeneration in this manner induced, is, of necessity, a permanent cause of feebleness, of premature decay, and not unfrequently, of sudden death.

QUESTION 3.—*Relating to feebleness of the body.*—The same argument that applies to feebleness of the digestive process and to feebleness of the circulation in relation to the use of alcohol, applies also to that general feebleness of the body which is commonly referred to when persons say that they are not strong enough to do without alcohol. I have found by direct experiment that the effect of alcohol is to reduce the muscular force, and that even during the excitement which alcohol produces in the stage of excitement, there is no actual increase of power, although there may be great muscular disturbance and apparent excess of motion. The general evidence on this point is most conclusive, and if I might venture to state my own individual experience, I would say that the evidence is as surprising as it is satisfactory I have worked actively while indulging in a moderate measure of alcohol daily. I have worked actively while abstaining altogether. In a word, I have made direct personal experiment on the subject, and I am bound to state that the work that can be done during entire abstinence is superior in every respect—in respect to amount, in respect to readiness of effort, in respect to quality, in respect to endurance, and in respect to mental ease and happiness.

QUESTION 4.—*Relating to the trial of Total Abstinence.*—The long-continued habit of taking alcohol engenders an appetite for it which, it must be confessed, is a very powerful influence in its support. To forget—to overcome—this appetite requires faculties of which many persons are deficient—viz. strength of will and determination. In some instances even courage is required, as well as strength of will, in order to overcome the desire engendered by the habit. But when the will is strong enough for the effort the triumph of total abstinence is certain.

An error often committed by temporary abstainers rom alcohol is that ailments to which they become subject after they commenced to abstain, and which would have occurred with equal certainty if alcohol had been persisted in, are caused by the abstinence. It is specially necessary to warn from this error those who are beginning to abstain. There is no evidence whatever that I can discover in favour of the supposition that any disease occurs from or is dependent on, total abstinence. The best evidence on the point now under consideration is, however, afforded in the effects of enforced abstinence on those alcoholics, who, under hospital, workhouse, or prison discipline, are rigidly and peremptorily debarred from alcohol. I have failed so far to obtain a single instance of the origin of any known and definable disease from this process of enforced abstinence. No one, I believe, has ever pretended to write out a history of a disease induced by the process. On the contrary, the generally expressed opinion is that the enforced abstinence promotes health, and, when the stimulant is subdued, tends to promote the after-sobriety of professed inebriates more effectively than any other measure that has been tried for the prevention of habitual intoxication.

APPENDIX.

MEDICAL DECLARATIONS ON THE USE OF INTOXICATING LIQUORS AND ABSTINENCE FROM THEM.

(From "The Bases of the Temperance Reform.")

BESIDES a great variety of collective statements signed by medical men residing in the same town or district, three General Certificates of the most important character have been published. The First of these was drawn up in 1839 by Julius Jeffreys, Esq., himself one of the Faculty, and the inventor of the well-known respirator. It was expressed in these terms:—"An opinion handed down from rude and ignorant times, and imbibed by Englishmen from their youth, has become very general, that the habitual use of some portion of alcoholic drink, as of wine, beer, or spirit, is beneficial to health, and even necessary for those subjected to habitual labour. Anatomy, physiology, and the experience of all ages and countries, when properly examined, must satisfy every mind well informed in medical science that the above opinion is altogether erroneous. Man in ordinary health, like other animals, requires not any such stimulants, and cannot be benefited by the habitual employment of any quantity of them, large or small; nor will their use during his life-time increase the aggregate amount of his labour. In whatever quantity they are employed they will rather tend to diminish it. When he is in a state of temporary debility from illness or other causes, a temporary use of them, as of other stimulant medicines, may be desirable; but as soon as he is raised to his natural standard of health a continuance of their use can do no good to him, even in the most moderate quantities, while large quantities (yet such as by many persons are thought moderate) do, sooner or later, prove injurious to the human constitution without any exceptions. It is my opinion that the above statement is substantially correct." This important document was signed by Sir Benjamin Brodie, F.R.S., Dr. W. F. Chambers, F.R.S., Physician to the Queen, Sir James Clark, Barnsby Cooper, F.R.S., Dr. D. Davis, Physician to the Duchess of Kent, Sir John Eyre, M.D., Dr. R. Ferguson, Dr. Marshall Hall, F.R.S., Dr. J. Hope, F.R.S., C. A. Key, Dr. R. Lee, F.R.S., Herbert Mayo, F.R.S., R. Partridge, F.R.S., Richard Quain, Professor of Anatomy in London University, Dr. A. T. Thomson, R. Travers, F.R.S., Surgeon Extraordinary to the Queen, Drs. Andrew and Alexander Ure, and in all by seventy eight members of the medical faculty in London and the provinces, most of them men of distinction and authority in the profession.

In 1847 a Second Medical Certificate, in whose composition several London physicians of the highest eminence were concerned, was published by John Dunlop, Esq., who had taken an active interest in its preparation, and in securing signatures to it. These written adhesions amounted, in the course of a few years, to upwards of 2,000, and comprised the names of physicians and surgeons engaged in every branch of the profession, and acquainted with every detail, theoretical and practical, of the science of medicine in all its departments. This testimony was as follows:—

"We, the undersigned, are of opinion—1. That a very large portion of human misery, including poverty, disease, and crime, is induced by the use of alcoholic or fermented liquors as beverages. 2. That the most perfect health is compatible with total abstinence from all intoxicating beverages, whether in the form of ardent spirits, or as wine, beer, ale, porter, cider, etc., etc. 3. That persons accustomed to such drinks may, with perfect safety, discontinue them entirely, either at once, or gradually after a short time. 4. That total and universal abstinence from alcoholic liquors and beverages of all sorts would greatly contribute to the health, the prosperity, the morality, and the happiness of the human race."

Among the signatures to this valuable document were those of Dr. Addison, Senior Physician of Guy's Hospital, Dr. Nicoll Arnott, Physician to the Queen, and author of the "Elements of Physics," Dr. B. G. Babington, F.R.S., Dr. A. Billing, F.R.S., John Bostock, F.R.S., Dr. R. Bright, F.R.S., Physician to the Queen, Sir B. C. Brodie, F.R.S., Sir W. Burnett, M.D., F.R.S., Physician-General to the Navy, Dr. W. B. Carpenter, F.R.S., Sir J. Clark, M.D., F.R.S., Dr. Copland, F.R.S., author of the "Dictionary of Practical Medicine," Dr. A. Farr, F.R.S., Dr. Robert Fergusson, Physician to the Queen, Sir J. Forbes, M.D., F.R.S., W. A. Guy, M.D., Professor at King's College, Sir H. Holland, M.D., F.R.S., Physician to the Queen, Dr. P. M. Latham, Physician to the Queen, Sir J. McGrigor, Bart., M.D., F.R.S., Director-General of the Army Medical Department, Dr. J. A. Paris, President of the Royal College of Physicians, Dr. J. Pereira, F.R.S., Dr. W. Prout, F.R.S., Dr. Forbes Winslow, Dr. A. Combe, Dr. P. Compton, F.R.S., and many others of equal, or nearly equal, eminence with the foregoing.

The latest *Medical Declaration concerning Alcohol* was issued in December, 1871, and is as follows:—

"As it is believed that the inconsiderate prescription of large quantities of alcoholic liquids by Medical Men for their patients has given rise, in many instances, to the formation of intemperate habits, the undersigned, while unable to abandon the use of alcohol in the treatment of certain cases of disease, are yet of opinion that no medical practitioner should prescribe it without a sense of grave responsibility. They believe that alcohol, in whatever form, should be prescribed with as much care as any powerful drug, and that the directions for its use should be so framed as not to be interpreted as a sanction for excess, or necessarily for the continuance of its use when the occasion is past.

"They are also of opinion that many people immensely exaggerate the value of alcohol as an article of diet, and since no class of men see so much of its ill effects, and possess such power to restrain its abuse, as members of their own profession, they hold that every Medical Practitioner is bound to exert his utmost influence to inculcate habits of great moderation in the use of alcoholic liquids.

"Being also firmly convinced that the great amount of drinking of alcoholic liquors among the working classes of this country is one of the greatest evils of the day, destroying, more than anything else, the health, happiness, and welfare of those classes, and neutralising, to a large extent, the great industrial prosperity which Providence has placed within the reach of this nation, the undersigned would gladly support any wise legislation which would tend to restrict within proper limits the use of alcoholic beverages, and gradually introduce habits of temperance."

Signed by George Burrows, M.D., F.R.S., President of the Royal College of Physicians, Physician Extraordinary to the Queen, George Busk, F.R.S., President of the Royal College of Surgeons, and nearly three hundred of the most eminent members of the Faculty in London.

INDIVIDUAL MEDICAL TESTIMONIES.

The following Medical *dicta* are culled from a large repertory of voluntary evidence, much of it given without any intention of aiding the Temperance Reform.

ABERNETHY.—"If people will leave off drinking alcohol, live plainly, and take very little medicine, they will find that many disorders will be relieved by this treatment alone." "Wine is neither food nor drink, but a stimulant."

BOERHAAVE.—"Food, not too fat or gross, and water as a drink, render our bodies the most firm and strong."

DR. BRINTON (St. Thomas's Hospital).—"Mental acuteness, accuracy of perception, and delicacy of the senses are all so far opposed by the action of alcohol as that the maximum efforts of each are incompatible with the ingestion of any moderate quantity of fermented liquid. The mathematician, the gambler, the metaphysician, the billiard-player, the author, the artist, the physician, would, if they could analyse their experience aright, generally concur in the statement that a single glass will often suffice to take, so to speak, the edge off both mind and body, and to reduce their capacity to something below what is relatively their perfection of work."

Sir Benjamin Brodie.—"I cannot doubt that, on the whole, the condition of mankind would have been much better if alcoholic liquors had never been within their reach." "Stimulants do not create nervous power; they merely enable you, as it were, to use up that which is left, and then they leave you more in need of rest than you were before." "It is worthy of notice that opium is much less deleterious to the individual than gin or brandy."

Dr. Beddoes (1802).—"As the greatest authorities are against wine, as there are none worth regard on the other side, and, above all, as there is so little danger of being thought odd (in children abstaining), why risk the early destruction of that organ (the stomach) which may be regarded as the great regulator of the inward man?" "All considerations combine to show that fermented liquors, by their activity, class with the most powerful, and, therefore, with the most hazardous drugs. In women the digestive organs may be as much injured by a glass (suppose two ounces) of wine as in a robust man by a pint."

Dr. W. B. Carpenter.—"My opinion is that in the ordinary duties of life alcohol is not necessary, but injurious in so far as it acts at all. Even in small quantities habitually taken, it perverts the ordinary functions by which the body is sustained in health."

Sir A. Carlisle, M.D.—"Long-continued experience in my profession has convinced me of the safety of a sudden transition from the daily employment of strong drink to a water diet, and that in the most inveterate cases. I have known the most emaciated and broken-down frames, both in body and mind, to spring up and become renovated after a total abstinence from strong liquors for only a few weeks."

Dr. T. K. Chambers.—"It is clear that we must cease to regard alcohol as in any sense an aliment."

Dr. George Cheyne, F.R.S. (1700).—"Without ale, peradventure, water was the primitive original beverage, and it is the only simple fluid fitted for diluting, moistening, and cooling—the code of drink appointed by nature. Happy had it been for the race of mankind if other revised and artificial liquors had never been invented! It has been an agreeable experience to me to observe with what freshness and vigour those who, though eating freely of flesh meat, yet drank nothing but this element have lived in health and cheerfulness to a great age."

DR. JOHN CHEYNE (late Physician-General of the Army in Ireland).—" The observation of twenty years in this city (Dublin) has convinced me that were ten young men on their twenty-first birthday to begin to drink one glass (equal to two ounces) of ardent spirits, or a pint of port wine or sherry, and were they to drink this supposed moderate quantity of strong liquor daily, the lives of eight out of the ten would be abridged by twelve or fifteen years. They represent themselves as temperate—very temperate."

SIR ANDREW CLARK, M.D., F.R.C.P., London, Physician in Ordinary to the Queen, Senior Physician at the London Hospital.—" As I looked at the Hospital wards to-day, and saw that seven out of ten owed their diseases to alcohol, I could but lament that the teaching about this question was not more direct, more decisive, more home-thrusting than ever it had been. . . . . . Can I say to you any words stronger than these of the terrible effects of the abuse of alcohol ? It is when I myself think of all this that I am disposed, as I have said elsewhere, to rush to the opposite extreme, to give up my profession, to give up everything and to go forth upon a holy crusade, preaching to all men—*Beware of this enemy of the race.*"

SIR ASTLEY COOPER (the eminent Surgeon).—" I never suffer ardent spirits to be in my house, thinking them evil spirits, and if the poor could witness the white livers, the dropsies, and shattered nervous systems which I have seen as the consequence of drinking, they would be aware that spirits and poisons are synonymous terms."

DR. COPLAND (author of " Dictionary of Practical Medicine ").—" There can be no doubt that, as expressed by the late Dr. Gregory, an occasional excess is, upon the whole, less injurious to the constitution than the practice of daily taking a moderate quantity of any fermented liquor or spirit."

DR. CULLEN (Edinburgh).—" Simple water, such as nature affords it, is, without any addition, the proper drink of mankind. The drinks which supply the necessary liquid (that is for the support of the functions of the animal economy) do it only by the quantity of elementary water they severally contain."

Dr. Erasmus Darwin (1800).—"Under the names of rum, brandy, gin, whisky, wine, cider, beer, and porter, alcohol is become the bane of the Christian world."

Sir John Floyer.—"Water drinkers are temperate in their actions, prudent and ingenious. They live safe from those diseases which affect the head, such as apoplexies, palsies, pain, blindness, deafness, gout, convulsions, trembling, and madness. To the use of water children ought to be bred from their cradles."

Sir John Forbes, F.R.S.—"Men can do well without alcoholic drinks. It cannot be admitted that the most moderate quantity is, speaking generally, requisite for the maintenance of perfect vigour under any ordinary circumstances of bodily labour. On the contrary, it seems proved that a proper allowance of good food, without any alcoholic drinks, is the best support of man."

Dr. T. W. Gairdner (Glasgow).—"I am strongly persuaded that to the young, in typhus and most other fevers, stimulants are not less actively poisonous and destructive, unless administered with the most extreme caution, and in the most special and critical circumstances."

Dr. Garnett (author of "Lectures on Zoonomia," 1804).—"The most mischievous agent of all, and which contributes to bring on the greater number of nervous complaints, is wine. This, I believe, produces more diseases than all other causes put together. Every person is ready to allow that wine taken to excess is hurtful, because he sees immediate evils will follow, but the distant effects, which require more attentive observation to perceive, very few see and believe; and, judging from pleasant and agreeable feelings, they say that a little wine is wholesome and good for every one, and accordingly take it every day, and even give it to their children. The idea that wine or spirituous liquors will assist digestion is false. Those who are acquainted with chemistry know that food is rendered hard and less digestible by these means."

Sir William Gull, F.R.S. (Physician to Her Majesty).—" I should say, from my experience, that alcohol is the most destructive agent that we are aware of in this country. . . . I would like to say that a very large number of people in society are dying day by day poisoned by alcohol, but not supposed to be poisoned by it."

Dr. John Hope (Inventor of the Stetheoscope).—" I have a strong conviction that drinking is the grand curse of this country, and more especially the notion almost universally prevalent among the lower classes that a proportion of stimulating liquors is indispensable for the maintenance of health and strength, under which impression they take from two to four pints of ale per day, and think *that* moderation. I have hitherto taken no part in the cause of teetotalism, but if the question should ever become a strictly medical one, I shall feel it due to my country, and to the cause of humanity, to lend the aid of my feeble pen on the affirmative side."

Sir Henry Holland, F.R.S.—" We have not the less assurance that it (wine) is in numerous other cases habitually injurious in relation both to the digestive organs and to the functions of the brain. It is the part of every wise man once, at least, in life to make trial of the effect of leaving off wine altogether, and this even without the suggestion of actual malady. To obtain them (the results) fairly, the abandonment must be complete for a time, a measure of no risk even where the change is greatest."

Dr. James Johnson.—"A very considerable proportion of the middle and higher classes of life, as well as the lower, commit serious depredations on their constitutions, when they believe themselves to be sober citizens, and really abhor debauch. This is by drinking ale or other malt liquor to a degree far short of intoxication indeed, yet from long habit producing a train of effects that embitter the ulterior periods of existence."

Professor Hoffman (Prussia).—" Drinkers of water, provided it be pure and excellent, are more healthy and longer-lived than such as drink wine or malt liquors. It generally gives them a better appetite, and renders them plump and fleshy."

DR. HUFELAND (Prussia, author of "The Art of Prolonging Life").—"The best drink is water, a liquor commonly despised, and even considered as prejudicial. I will not hesitate, however, to declare it to be one of the greatest means of prolonging life."

DR. LATHAM.—"There are whole classes of society in London who are never really sober for years together. The stimulus of spirits renewed day by day, and hour by hour, gives them feelings and excitement which are unnatural; and however they may be mistaken for those of health, do not in truth at all belong to it."

DR. E. LANKESTER, F.R.S.—"So far as its physical action is concerned, I do not know that we can say anything good of alcohol at all; it may seriously interfere with the functions of absorption, and injure the coats of the stomach, and when taken injudiciously, even a long way short of producing any effect on the nervous system, may yet prevent the proper nutrition of the system, and insiduously lay the foundation of incurable disease."

DR. MICHEL LEVY.—"The influence of alcohol upon the nervous system, and particularly upon the brain, is manifest by a progressive but constant series of symptoms which, in different degrees of intensity, are reproduced in all individuals. These constitute a true poisoning, and this morbid state is exhibited under three phases, viz. excitation, perturbation, abolition of the cerebro-spinal functions."

DR. MACROIRE (late Physician to the Fever Hospital, Liverpool).—"After having treated more than three hundred thousand cases in the town hospital, Liverpool, I give it as my decided opinion that the constant moderate use of stimulating drink is more injurious than the now and then excessive indulgence in them."

DR. MARKHAM (late editor of "British Medical Journal").—"We are in conscience bound to say that science has found that alcohol is not good, and that being simply a stimulant to the nervous system, its use is hurtful to the body of a healthy man."

THE END.